

Table 2.5 Thermodynamic data for organic compounds (all values are for 298 K)

	$M/(\text{g mol}^{-1})$	$\Delta_f H^\ominus/(\text{kJ mol}^{-1})$	$\Delta_f G^\ominus/(\text{kJ mol}^{-1})$	$S_m^\ominus/(\text{J K}^{-1} \text{mol}^{-1})$	$C_{p,m}^\ominus/(\text{J K}^{-1} \text{mol}^{-1})$	$\Delta_c H^\ominus/(\text{kJ mol}^{-1})$
C(s) (graphite)	12.011	0	0	5.740	8.527	-393.51
C(s) (diamond)	12.011	+1.895	+2.900	2.377	6.113	-395.40
CO ₂ (g)	44.010	-393.51	-394.36	213.74	37.11	
Hydrocarbons						
CH ₄ (g), methane	16.04	-74.81	-50.72	186.26	35.31	-890
CH ₃ (g), methyl	15.04	+145.69	+147.92	194.2	38.70	
C ₂ H ₂ (g), ethyne	26.04	+226.73	+209.20	200.94	43.93	-1300
C ₂ H ₄ (g), ethene	28.05	+52.26	+68.15	219.56	43.56	-1411
C ₂ H ₆ (g), ethane	30.07	-84.68	-32.82	229.60	52.63	-1560
C ₃ H ₆ (g), propene	42.08	+20.42	+62.78	267.05	63.89	-2058
C ₃ H ₈ (g), cyclopropane	42.08	+53.30	+104.45	237.55	55.94	-2091
C ₃ H ₈ (g), propane	44.10	-103.85	-23.49	269.91	73.5	-2220
C ₄ H ₈ (g), 1-butene	56.11	-0.13	+71.39	305.71	85.65	-2717
C ₄ H ₈ (g), <i>cis</i> -2-butene	56.11	-6.99	+65.95	300.94	78.91	-2710
C ₄ H ₈ (g), <i>trans</i> -2-butene	56.11	-11.17	+63.06	296.59	87.82	-2707
C ₄ H ₁₀ (g), butane	58.13	-126.15	-17.03	310.23	97.45	-2878
C ₅ H ₁₂ (g), pentane	72.15	-146.44	-8.20	348.40	120.2	-3537
C ₅ H ₁₂ (l)	72.15	-173.1				
C ₆ H ₆ (l), benzene	78.12	+49.0	+124.3	173.3	136.1	-3268
C ₆ H ₆ (g)	78.12	+82.93	+129.72	269.31	81.67	-3302
C ₆ H ₁₂ (l), cyclohexane	84.16	-156	+26.8		156.5	-3920
C ₆ H ₁₄ (l), hexane	86.18	-198.7		204.3		-4163
C ₆ H ₅ CH ₃ (g), methyl- benzene (toluene)	92.14	+50.0	+122.0	320.7	103.6	-3953
C ₇ H ₁₆ (l), heptane	100.21	-224.4	+1.0	328.6	224.3	
C ₈ H ₁₈ (l), octane	114.23	-249.9	+6.4	361.1		-5471
C ₈ H ₁₈ (l), iso-octane	114.23	-255.1				-5461
C ₁₀ H ₈ (s), naphthalene	128.18	+78.53				-5157
Alcohols and phenols						
CH ₃ OH(l), methanol	32.04	-238.66	-166.27	126.8	81.6	-726
CH ₃ OH(g)	32.04	-200.66	-161.96	239.81	43.89	-764
C ₂ H ₅ OH(l), ethanol	46.07	-277.69	-174.78	160.7	111.46	-1368
C ₂ H ₅ OH(g)	46.07	-235.10	-168.49	282.70	65.44	-1409
C ₆ H ₅ OH(s), phenol	94.12	-165.0	-50.9	146.0		-3054
Carboxylic acids, hydroxy acids, and esters						
HCOOH(l), formic	46.03	-424.72	-361.35	128.95	99.04	-255
CH ₃ COOH(l), acetic	60.05	-484.5	-389.9	159.8	124.3	-875
CH ₃ COOH(aq)	60.05	-485.76	-396.46	178.7		
CH ₃ CO ₂ ⁻ (aq)	59.05	-486.01	-369.31	86.6	-6.3	
(COOH) ₂ (s), oxalic	90.04	-827.2			117	-254
C ₆ H ₅ COOH(s), benzoic	122.13	-385.1	-245.3	167.6	146.8	-3227
CH ₃ CH(OH)COOH(s), lactic	90.08	-694.0				-1344
CH ₃ COOC ₂ H ₅ (l), ethyl acetate	88.11	-479.0	-332.7	259.4	170.1	-2231
Alkanals and alkanones						
HCHO(g), methanal	30.03	-108.57	-102.53	218.77	35.40	-571
CH ₃ CHO(l), ethanal	44.05	-192.30	-128.12	160.2		-1166
CH ₃ CHO(g)	44.05	-166.19	-128.86	250.3	57.3	-1192
CH ₃ COCH ₃ (l), propanone	58.08	-248.1	-155.4	200.4	124.7	-1790

